

# CARDIOPULMONARY RESUSCITATION

## STANDARDS FOR CLINICAL PRACTICE AND TRAINING

A Joint Statement

from

The Royal College of Anaesthetists  
The Royal College of Physicians of London  
The Intensive Care Society  
The Resuscitation Council (UK)



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### **This document has been endorsed by:**

The Council for Professionals as Resuscitation Officers  
The National Patient Safety Agency  
The Royal College of Physicians of Edinburgh  
The Royal College of Physicians and Surgeons of Glasgow  
The Royal College of Surgeons of England  
The Royal College of Surgeons of Edinburgh  
The Royal College of Paediatrics and Child Health  
The Royal College of Nursing  
The Faculty of Accident and Emergency Medicine

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## 1. Introduction

Healthcare institutions have an obligation to provide an effective resuscitation service and to ensure that their staff receive training and regular updates for maintaining a level of competence appropriate to each individual's employed role. This requires appropriate equipment for resuscitation, training in resuscitation, managerial and secretarial support, financial planning, and continual reappraisal of standards and results. Failure to provide an effective service is a failure in duty of care that is a clinical risk, contravenes the principles of clinical governance, and has implications for clinical negligence premiums.

As outcome from cardiac arrest remains poor, an important aspect of an institution's resuscitation planning is the delivery of timely and effective treatment to make it less likely that critically ill patients deteriorate to the point of cardiopulmonary arrest.

This document provides guidelines for clinical practice and training for those with a responsibility for resuscitation services within healthcare institutions. The document builds on previous reports from the Royal College of Physicians, the Royal College of Anaesthetists, the British Medical Association, the Royal College of Nursing, and the Resuscitation Council (UK).

Throughout this document the term 'healthcare institution' is used. While the guidance contained is directed to all institutions where clinical patient care is undertaken the term is applicable mainly to hospitals admitting acutely ill patients. Healthcare institutions need to base their resuscitation service on a detailed and documented risk assessment for their sites.

## 2. Summary

- Healthcare institutions should have, or be represented on, a resuscitation committee that is responsible for all resuscitation issues.
- Every institution should have at least one resuscitation officer responsible for teaching and conducting training in resuscitation techniques.
- Staff with patient contact should be given regular resuscitation training appropriate to their expected abilities and roles.
- Clinical staff should receive regular training in the recognition of patients at risk of cardiopulmonary arrest and the measures required for the prevention of cardiopulmonary arrest.
- Healthcare institutions admitting acutely ill patients should have a resuscitation team, or its equivalent, available at all times.
- Clear guidelines should be available indicating how and when to call for the resuscitation team.
- Cardiopulmonary arrest should be managed according to current national guidelines.
- Resuscitation equipment should be available throughout the institution for clinical use and for training.
- The practice of resuscitation should be audited to maintain and improve standards of care.
- A do not attempt resuscitation (DNAR) policy should be compiled, communicated to relevant members of staff, used and audited regularly.
- Funding must be provided to support an effective resuscitation service.

### 3. Resuscitation Committee

#### Recommendations:

1. Healthcare institutions should have, or be represented on, a resuscitation committee that meets regularly, e.g., quarterly, and whose purpose is to ensure clear leadership of the resuscitation service.
2. Essential members of the resuscitation committee include a physician, the senior resuscitation officer, an anaesthetist /intensivist, and a senior manager. Representation from other departments, e.g., emergency medicine, paediatrics, cardiology, obstetrics, pharmacy, nursing, general practice, dentistry, mental health, and ambulance services will depend on local needs and arrangements.
3. The resuscitation committee should be responsible for implementing operational policies governing cardiopulmonary resuscitation, practice and training. It should determine the level of resuscitation training required by individual staff members.
4. The chair of the resuscitation committee should be a senior clinician with an active and credible involvement in resuscitation. This individual would be expected to have the authority to drive and implement change.
5. The resuscitation committee should be responsible for:
  - ensuring adherence to national resuscitation guidelines and standards;
  - defining the role and composition of the resuscitation team;
  - ensuring resuscitation equipment for clinical use is available;
  - ensuring appropriate resuscitation drugs (including those for peri-arrest situations) are available;
  - planning adequate provision of training in resuscitation;
  - determining requirements for and choice of resuscitation training equipment;
  - all policies relating to resuscitation and anaphylaxis;

- a policy on resuscitation decisions, e.g., DNAR;
  - audit of resuscitation outcomes and implementation of DNAR policies;
  - recording and reporting critical incidents in relation to resuscitation.
6. The resuscitation committee should have a direct link to higher levels of the institution's management structure, e.g., to clinical governance. Ideally, the institution should have an executive board member responsible for resuscitation services.
  7. The resuscitation committee must have secretarial support.
  8. The resuscitation committee should ensure there is defined financial support for resuscitation services within the institution. A business plan should indicate what resources are needed to maintain and upgrade clinical and training equipment throughout the institution and to provide adequate staff and facilities for training.

## 4. Resuscitation Officers

### Recommendations:

1. Every institution should have at least one person, the resuscitation officer (RO), who is responsible for co-ordinating the teaching and training of staff in resuscitation. This person may have additional responsibilities, e.g., audit, or maintenance of clinical equipment.
2. Depending on the size and geographical distribution of the institution, more than one RO may be needed to fulfil training requirements and additional responsibilities relating to resuscitation. Typically, one RO is required for every 750 members of clinical staff.
3. Resuscitation officers should possess a current Advanced Life Support (ALS) provider certificate as a minimum standard; ideally, they should be qualified ALS instructors. Where appropriate, the institution should ensure that ROs also possess certified training certificates in other specialist areas, e.g., paediatrics, obstetrics and trauma.



4. Advice about professional development of ROs should be sought from the Council for Professionals as Resuscitation Officers (CPRO).
5. The RO must have access to a designated training room of adequate size. The room should accommodate comfortably up to 10 people plus all the training equipment required for any teaching session. The RO should have access to suitable electronic teaching aids and projection facilities. There should be adequate space for storing equipment. Separate office space, with a desk and filing cabinets, should also be available.
6. The RO must have adequate secretarial assistance.
7. Equipment for training, including adult and paediatric manikins, airway management trainers, an ECG monitor and rhythm simulator, and at least one defibrillator dedicated for training, should be available. Training defibrillators should be the same as those used in the clinical areas of the institution.
8. There should be a defined resuscitation budget made available for the RO to maintain, upgrade and purchase new equipment for patient use and for training. Purchasers of health care should be made aware of this when contracts are negotiated and adequate provision should be made. Such financial support for resuscitation services should be taken into account during budget planning by the institution.
9. The RO should be responsible for ensuring that there are systems in place for maintaining resuscitation equipment in good working order. This may mean delegation of routine checking of equipment to other members of staff.
10. The RO should ensure that all cardiopulmonary arrests are documented and audited using a standard pro forma based on the current Utstein template.
11. In order to maintain standards and clinical credibility, the RO should attend cardiopulmonary arrests regularly and provide feedback to team members as part of their continuing training in resuscitation.

12. The RO has a responsibility to maintain his/her own education in resuscitation. This should involve teaching on resuscitation courses outside the institution and attending relevant professional meetings. Attendance at professional meetings should be supported with a budget for study expenses.
13. ROs should not be expected to generate income to provide for their own salary.
14. If the RO is expected to generate income for the institution it should be agreed in writing with the relevant manager. Any income should be directed to improving resuscitation services.

## 5. Training of Staff

### Recommendations:

1. Staff should undergo regular resuscitation training to a level appropriate for their expected clinical responsibilities.
2. Training staff to recognise patients at risk of cardiopulmonary arrest, and to start treatment to prevent cardiopulmonary arrest, is an important component of improving survival in critical illness.
3. Training should be provided in the use of an "early warning scoring" system to identify patients who are critically ill and therefore at risk of cardiopulmonary arrest.
4. Training must be in place to ensure that clinical staff can undertake cardiopulmonary resuscitation. Training and facilities should ensure that, when cardiopulmonary arrest occurs, staff are able to:
  - recognise the cardiopulmonary arrest;
  - summon help;
  - start CPR using airway adjuncts, and attempt defibrillation within 3 minutes of collapse. This is a minimum standard. In the community, individual organisations should conduct a risk assessment of their particular site(s) to decide whether

to provide an automated external defibrillator (AED) and associated training. Implementation of an AED programme is indicated if the incidence of cardiac arrest makes it likely that an AED would be used at least once in every 5 years.

5. Clinical staff should update their skills annually.
6. A system must be in place for identifying resuscitation equipment that requires special training, such as defibrillators.
7. All new members of staff should have resuscitation training as part of their induction programme.
8. The extension of nursing skills, e.g., to the use of airway adjuncts, intravenous cannulation, rhythm recognition, manual defibrillation and administration of specific drugs in resuscitation, should be encouraged.
9. Training in resuscitation must be a fundamental requirement for medical and nursing qualifications. Undergraduate and postgraduate examinations for all healthcare workers should include an evaluation of competency in resuscitation.
10. The RO should organise and co-ordinate resuscitation training for staff. However, in order to achieve training targets, the RO may need to delegate some aspects of training.
11. Institutions should recognise and make provision for staff to have enough time to train in resuscitation skills as part of their employment.
12. Specific training for cardiopulmonary arrests in special circumstances (e.g., paediatrics, newborn, pregnancy and trauma) should be provided for medical, nursing and other clinical staff in the relevant specialties.
13. All clinical staff should have the opportunity to attend a multiprofessional course in the recognition, monitoring and management of the critically ill patient.
14. All training should be recorded in a central database.

15. Members of the resuscitation team with a regular involvement in resuscitation, particularly team leaders, may require a level of training beyond that provided by the local RO.

These individuals should be encouraged to attend national courses such as the Advanced Life Support (ALS) course, the European Paediatric Life Support (EPLS) course, the Advanced Paediatric Life Support (APLS) course, the Newborn Life Support (NLS) course and the Advanced Trauma Life Support (ATLS) course.

## 6. Cardiopulmonary Arrest Prevention

### Recommendations:

1. An early warning scoring system should be in place to identify patients who are critically ill and therefore at risk of cardiopulmonary arrest.
2. The institution should have a designated outreach service or medical emergency team (e.g., MET) capable of responding to acute clinical crises identified by clinical triggers or other indicators.
3. The institution should have a patient charting system that facilitates the regular measurement and recording of early warning scores.
4. The institution should have a clear and specific policy that requires a clinical response to 'calling criteria' or early warning systems ('track and trigger'). This should include the specific responsibilities of senior medical and nursing staff, including consultants.

## 7. The Resuscitation Team

### Recommendations:

The institution should have a team that is activated in response to a cardiopulmonary arrest. Ideally, the team should include at least two doctors with current training in advanced life support. The exact composition of the team will vary between institutions, but overall the team must have the following skills:

- airway interventions, including tracheal intubation;
  - intravenous cannulation, including central venous access;
  - defibrillation (advisory and manual) and cardioversion;
  - drug administration;
  - the ability to undertake advanced resuscitation skills (e.g., external cardiac pacing, pericardiocentesis);
  - skills required for post-resuscitation care.
1. The local resuscitation committee should determine the composition of the resuscitation team. The development of an emergency team (e.g., MET) to treat patients at risk of cardiopulmonary arrest is strongly encouraged.
  2. The resuscitation team should be responsible for issues relating to the management of relatives (who may or may not wish to be present at a cardiopulmonary arrest), post-resuscitation transfer, and debriefing.
  3. The resuscitation team should be summoned to all cardiopulmonary arrests by the use of a common telephone number. This number should be 2222.
  4. The institution must ensure that the resuscitation team is activated within 30 seconds of the call for help. This system must be tested daily. In some circumstances (usually not in hospital) this rapid response will be achievable following a 999 call to the ambulance service.
  5. The role of team leader should be undertaken by an individual trained to the level of the ALS course, or, if the patient is a child, the equivalent paediatric qualification. The team leader will usually be one of the doctors on the resuscitation team.

6. The team leader is responsible for directing and co-ordinating the resuscitation attempt, and responsible for safety at the cardiopulmonary arrest. The team leader is responsible for ending the resuscitation attempt when indicated. After the resuscitation attempt, the team leader is responsible for documentation (including audit forms) and for communication with relatives and other healthcare professionals involved in the patient's management.
7. The institution should ensure that a complete and detailed record of the cardiopulmonary arrest (using the Utstein data set) is retained within the patient's clinical record. This data should also be recorded on a central database.

## 8. Resuscitation of Children, Pregnant Patients and Trauma Victims

### Recommendations:

Special conditions apply to the resuscitation of children, pregnant patients and the victims of trauma. The cause of the cardiopulmonary arrest and the techniques of resuscitation may differ. In all cases it is imperative that staff with the appropriate experience are present at the resuscitation attempt.

### Children

- When attempting the resuscitation of a child in cardiopulmonary arrest, the team leader should be someone with expertise and training in the resuscitation of children.
- Special knowledge of the equipment and doses of drugs required for children, together with an understanding of the differences in causes and treatment of cardiopulmonary arrest, are essential. All members of the team should be familiar with their expected roles and have expertise in the resuscitation of children.
- Ideally, institutions should have a separate paediatric resuscitation team. At least one member of the paediatric resuscitation team should possess a qualification in paediatric resuscitation. All staff with a regular commitment

to paediatric resuscitation should be encouraged to attend national paediatric resuscitation courses, e.g., EPLS, APLS, NLS.

- When resuscitating a child, consideration should be given to the presence of the relatives. A member of staff should be delegated to stay with them and liaise with the team on their behalf.
- If a child's weight is not available, the use of paediatric resuscitation charts, based on the length of a child, is encouraged.

### **Trauma**

- Institutions admitting patients with major injuries should have a multidisciplinary trauma team.
- Management of the airway can be particularly challenging and must be undertaken by an individual skilled in rapid sequence induction and tracheal intubation.
- Resuscitation of the patient with major injuries may include the need for immediate surgery.

### **Pregnancy**

- Early involvement of an obstetrician and neonatologist is crucial when dealing with cardiopulmonary arrest in the pregnant patient.
- Particular attention should be paid to minimising vascular compression caused by the gravid uterus and to early advanced airway intervention.
- Peri-mortem Caesarean section may have to be undertaken early in the resuscitation attempt and equipment should be immediately available.

## **9. Resuscitation Equipment**

### **Recommendations:**

1. The choice of resuscitation equipment should be defined by the resuscitation committee and will depend on the anticipated workload, availability of equipment from nearby departments and specialised local requirements.

2. Ideally, the equipment used for cardiopulmonary resuscitation (including defibrillators) and the layout of equipment and drugs on resuscitation trolleys should be standardised throughout an institution.
3. Staff must be familiar with the location of all resuscitation equipment within their working area.
4. Portable oxygen and suction devices should be available at cardiopulmonary arrests, unless piped or wall oxygen and suction are to hand.
5. Provision should be made in all clinical areas to have access to resuscitation drugs, equipment for airway management, circulatory access and fluid administration quickly enough not to compromise successful resuscitation. In certain circumstances this may require the use of portable items and these items should be standardised throughout the institution. (A list of recommended items for use in adults and children is available on the Resuscitation Council (UK) website: [www.resus.org.uk](http://www.resus.org.uk)).
6. In addition to resuscitation equipment, clinical areas should have immediate access to stethoscopes, a device for measuring blood pressure, a pulse oximeter, a 12-lead ECG recorder and blood gas syringes. A method for verifying correct placement of the tracheal tube is recommended e.g., capnometry, or an oesophageal detector device.
7. The widespread deployment of AEDs or shock advisory defibrillators (SADs) will reduce mortality from in-hospital cardiopulmonary arrest caused by ventricular fibrillation. The provision of AEDs or SADs enables all clinical staff to attempt defibrillation safely after relatively little training, and their use is encouraged. These defibrillators should have recording facilities, screens and standardised consumables, e.g., electrode pads, connecting cables and control switches.
8. Ideally, the choice of defibrillators should be standardised throughout an institution and staff should be familiar with the device in use and the mode of operation. Manual defibrillators



should include the option of paediatric paddles in areas where children are treated. Defibrillators with an external pacing facility should be located strategically.

9. Responsibility for checking resuscitation equipment rests with the department where the equipment is held and checking should be audited regularly. The frequency of checking will depend upon local circumstances but should ideally be daily.
10. A planned replacement programme should be in place for equipment and drugs with funding allocated for this purpose.

## 10. Decisions Relating to Cardiopulmonary Resuscitation

### Recommendations:

1. It is essential to identify (a) patients for whom cardiopulmonary arrest is an anticipated terminal event and in whom cardiopulmonary resuscitation (CPR) is inappropriate; and (b) patients who do not wish to be treated with CPR.
2. All institutions should ensure that there is a clear and explicit resuscitation plan for all patients. For some patients this will involve a DNAR decision. Such decisions are complex clinically, ethically and emotionally. National guidelines from the British Medical Association, Resuscitation Council (UK) and the Royal College of Nursing provide a framework for formulating local policy. The institution should have a written policy about resuscitation decisions (including DNAR decisions) that is available to all clinical and managerial staff.
3. Where there is no resuscitation plan and the wishes of the patient are unknown, resuscitation should be initiated if cardiopulmonary arrest occurs. However, a decision not to attempt resuscitation may be appropriate when:
  - the patient's condition indicates that effective CPR is unlikely to be successful;

- CPR is not in accord with the recorded, sustained wishes of a mentally competent patient;
  - CPR is not in accord with an applicable advance directive (living will). Such directives are legally binding in England and Wales;
  - successful CPR is likely to be followed by a length and quality of life that is not in the best interests of the patient.
4. The overall responsibility for a DNAR decision rests with the most senior doctor in charge of the patient's care. The opinions of the members of the medical and nursing team (including the GP), the patient, and the patient's relatives, when appropriate, should be taken into account when forming the decision.
  5. The most senior available member of the medical team should enter the DNAR decision and the reasons for it in the medical records. It should also be documented whether the patient and relatives have been informed and their comments noted. If no discussion has taken place, the reasons for this should be documented. The use of a dedicated DNAR form is to be encouraged.
  6. The DNAR decision should be communicated effectively to all members of the multidisciplinary team involved in the patient's care. It should be reviewed regularly if there are changes in the patient's condition. The decision should be documented in the nursing notes and handed on at each change of shift.
  7. A decision not to attempt resuscitation applies only to CPR. It should be made clear to the patient, people close to the patient and members of the healthcare team that it does not imply "non-treatment" and that all other treatment and care that are appropriate for the patient will continue to be considered and offered.
  9. The institution should provide information for staff, patients and relatives about its resuscitation decisions.

## 11. Patient Transfer and Post-Resuscitation Care

### Recommendations:

1. Immediately after resuscitation, most patients are clinically unstable and likely to require admission to a coronary care or critical care unit; this will depend on factors such as previous health, severity of illness, and underlying diagnosis. Facilities for continuing care may not be available where the cardiopulmonary arrest occurred; transfer of the patient may be necessary.
2. Continuity of care during this period is vital. Senior staff should be involved before transfer. When appropriate, referral to specialists (e.g., cardiologist or intensivist) should be made. It is the responsibility of the resuscitation team leader to ensure that the transfer of care from one group of clinicians to another is efficient. The team leader should not leave the patient until this has occurred unless he/she has delegated care to an appropriate colleague.
3. The patient's condition should be stabilised as far as possible before transfer, but this should not delay definitive treatment.
4. Institutions must ensure that appropriate equipment, drugs and portable monitoring devices are readily available for the safe transfer of the patient from the scene of cardiopulmonary arrest to another facility, if required.
5. Transport between hospitals requires proper planning and liaison with the ambulance service.
6. Where transport of the patient requires road, air or sea routes, the institution must ensure that members of staff are insured against personal injury.
7. A patient being transferred should be accompanied by staff appropriately trained in the safe transfer of patients.
8. Relatives should be informed about the transfer of a patient, but should not expect to travel with the patient.

## 12. Audit and Reporting Standards

### Recommendations:

1. To ensure a high quality resuscitation service the institution should audit:
  - the availability and use of equipment (variable frequency);
  - the availability of cardiopulmonary arrest and peri-arrest drugs (variable frequency);
  - all cardiopulmonary arrests using the principles of the Utstein template (each event);
  - resuscitation decisions / DNAR (each event). Audit of DNAR policies is mandatory (Health Services Circular 2000/028);
  - cardiopulmonary arrest outcomes (each event);
  - critical incidents leading to cardiopulmonary arrest or occurring during the resuscitation attempt (each event);
  - the cleaning and decontamination of manikins (after each training session);
  - other health and safety issues, e.g., manual handling.
2. Institutions are encouraged to send data to relevant national audits, e.g., National Audit of Paediatric Resuscitation.
3. Ideally, audit should include periods of 'debriefing' after resuscitation attempts.
4. Where audit has identified deficiencies, steps must be taken to improve performance. The resuscitation committee must receive appropriate support from the clinical governance lead to achieve this.

## 13. Research

### Recommendations:

1. Research is needed to improve the resuscitation service. Individuals who wish to further the scientific basis and clinical practice of resuscitation should be encouraged.
2. Clinical research in this area is challenging, not least because of the ethical issues raised. Individuals wishing to undertake research in resuscitation are advised to seek the advice and support of their local research ethics committees.

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## 15. Glossary

<b>AED</b>	Automated External Defibrillator
<b>ALS</b>	Advanced Life Support
<b>APLS</b>	Advanced Paediatric Life Support
<b>ATLS</b>	Advanced Trauma Life Support
<b>CPR</b>	Cardiopulmonary Resuscitation
<b>DNAR</b>	Do Not Attempt Resuscitation
<b>EPLS</b>	European Paediatric Life Support
<b>MET</b>	Medical Emergency Team
<b>NLS</b>	Newborn Life Support
<b>RO</b>	Resuscitation Officer
<b>SAD</b>	Shock Advisory Defibrillator

## Notes



Notes

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